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| EXAMINER | |
|---|---|
| ZETTL, MARY E | |
| **ART UNIT** | **PAPER NUMBER** |
| 2884 | |

DATE MAILED: 11/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/809,966 | BRABEC ET AL. | |
| | Examiner | Art Unit | |
| | Mary Zettl | 2884 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on *26 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 July 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to because Figure 1 contains handwritten descriptions. These literal descriptions are unnecessary, however if it is desired that they be included they must be typed. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Objections*

2. Claim 16 is objected to because of the following informalities: Claim reads "less than or equal to $\mu$ m." A number or the article "a" should precede "$\mu$ m" such that the intended quantity is clearly specified. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-11, 16-19, and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohashi et al. (JP 73032940 B) in view of Forrest et al. (US 6,198,091 B1).

Regarding claim 1-3 and 5, Kohashi et al. teach a device for measuring an ionizing radiation dosage comprising an ionizing radiation absorption structure comprising a photo-active semiconductor film layer comprising of two sublayers, a first layer comprised of a first of said two different semiconductors and functioning as an acceptor (p type layer consisting of $Cu_2S - Cu_2Se$) and a second sub-layer functioning as a donor (n type film consisting of CdS – CdSe doped with In) forming a heterojunction element, that supplies an output signal dependent on the ionizing radiation incident on the absorption structure (Abstract). Kohashi et al. do not disclose expressly a foil-like carrier upon which the ionizing radiation absorption structure is disposed. Forrest et al. teach an organic photosensitive optoelectronic device (Abstract) comprising a foil-like carrier (substrate made of metal foils, col. 31, lines 39-43) and an ionizing radiation absorption structure (Figure 4, items disposed on the foil-like carrier) comprising two different semiconductors forming a heterojunction diode structure. Forrest et al. further teach a first organic sub-layer (Figure 4, item 403) comprised of PTCDA or PTCBI (col. 18, lines 35-36) and a second organic sub-layer (Figure 4, item 404) comprised of CuPc (col. 18, line 37). Forrest et al. teach producing or detecting electromagnetic radiation (col. 1, lines 2-3), however do not disclose expressly measuring ionizing radiation. One skilled in the art would recognize that the device described by Forrest et al. could easily be adapted to measure ionizing radiation. At the time the invention was made it would be obvious to one of ordinary skill to take the invention of Kohashi et al. and modify if such that a foil-like carrier as described by

Forrest et al. was added in order to prevent exterior elements from acting on the thin films forming the photo-active layer of the device.

Regarding claim 4, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 3. Forrest et al. further teach at least one organic semiconductor functioning as a donor, and an additional material functioning as an acceptor.

Regarding claim 6, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 5. Forrest et al. further teach an embodiment of the invention in which the semiconductor film layer is formed by a first sub-layer comprised of two different semiconductors (first and second layers; col. 20, lines 31-33; Figure 6, items 603 and 604) and a second sub-layer is comprised of a second two different semiconductors (third and fourth layers; col. 20, lines 39-41; Figure 6, items 605 and 606), and wherein the first and second layers form a heterojunction (between layers 2 and 3; col. 20, line 37).

Regarding claim 7, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 5. Forrest et al. further teach forming a plurality of heterojunctions (subcells; col. 21, line 26 or arrays col. 31, line 31) in the semiconductor film layer.

Regarding claim 8, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 3. Forrest et al. further teach forming the photo-active semiconductor film layer comprising p-doped and n-doped sublayers forming a pn-junction (col. 4, lines 1-6 and line 41).

Regarding claim 9, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 3. Forrest et al. further teach the organic semiconductor material

(perylenetetracarboxylic dianhydride; col. 4, lines 27-29) being selected from the group consisting of semiconducting conjugate polymers, derivatives of semiconducting conjugate polymers, low molecular weight semiconductors, and plastics selected from the group consisting of monomers, oligomers and polymers.

Regarding claim 10, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 2. Forrest et al. further teach at least one the thin film electrodes comprising a material selected from the group consisting of conductive polymers, doped polymers, metals, metal alloys, metal oxides and alloy oxides (col. 20, lines 26-27).

Regarding claim 11, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 1. Forrest et al. further disclose that the foil-like carrier is comprised of a material selected from the group consisting of plastic and glass (col. 31, lines 39-43).

Regarding claim 16, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 1. Forrest et al. further teach a diode structure (Figure 6) comprising two film electrodes and a photo-active semiconductor film layer disposed between the two film electrodes, and wherein the photo-active semiconductor film layer has a thickness of less than or equal a $\mu$m (300-1,000 Angstrom; col. 18, line 52).

Regarding claim 17, Kohashi et al. in view of Forrest et al. teach the limitations et forth in claim 16. Forrest et al. further teach the device wherein the photoactive semiconductor film layer has a thickness that is less than or equal to 1 $\mu$m (300-1,000 Angstrom; col. 18, line 52).

Regarding claim 18, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 1. Forrest et al. further teach a diode structure (Figure 6) comprising

two film electrodes and a photo-active semiconductor film layer disposed between the two film electrodes, and wherein at least one of the film electrodes has a thickness of less than or equal 2 $\mu$ m (1,000-4,000 Angstrom; col. 18, line 33).

Regarding claim 19, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 18. Forrest et al. further teach the film electrodes having a thickness of less than or equal to 1 $\mu$ m (1,000-4,000 Angstrom; col. 18, line 33).

Regarding claims 21 and 22, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 1. Forrest et al. further teach an absorption structure and a plurality of further absorption structures distributed on a foil-like carrier (col. 31, lines 39-43) in a matrix-like arrangement (array; col. 31, lines 30-32).

Regarding claim 23, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 1. Forrest et al. further teach a foil-like carrier (substrate; Figure 6, item 601) and the absorption structure (Figure 6, items 603-606) forming a common, unitary component (Figure 6). Forrest et al. further teach the use of this device in a radiation detector (col. 31, line 63). Forrest et al. do not disclose expressly the components being combined in one unitary component. It would be obvious to one skilled in the art to combine the radiation detector, the foil-like carrier, and the absorption structure into one unitary component in order to reduce the number of separate components necessary.

Regarding claim 24, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 23. Kohashi et al. in view of Forrest et al. do not specify a solid-state radiation detector. Solid-state radiations detectors are the most common type of

radiation detector. It would thus, be obvious to one of ordinary skill to use the common solid-state detector in the invention described by Forrest et al.

Regarding claim 25, Kohashi et al. teach a device disposed in a path of ionizing radiation for measuring a dose of the ionizing radiation, comprising an ionizing radiation absorption structure, comprising a plurality of thin-film layers disposed one above another, forming a thin-film diode structure that supplies an output signal dependent on the ionizing radiation incident on the absorption structure (abstract). Kohashi et al. do not disclose expressly a foil-like carrier. Forrest et al. teach the use of a photosensitive device (Abstract) in a radiation detector (col. 31, line 63) and/or an imaging device (col. 31, line 63) comprising a foil-like carrier (substrate; col. 31, lines 39-43). At the time the invention was made it would be obvious to one of ordinary skill to take the invention of - Kohashi et al. and modify if such that a foil-like carrier as described by Forrest et al. was added in order to prevent exterior elements from acting on the thin films forming the photo-active layer of the device. Kohashi et al. in view of Forrest et al. do not disclose expressly a radiation detector disposed in the path of ionizing radiation produced by a radiation source. The need for a radiation source and the need to place the detector in the path of the ionizing radiation for detecting purposes would be inherently known to one skilled in the art.

4. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohashi et al. (JP 73032940 B) in view of Forrest et al. (US 6,198,091 B1) and further in view of Komashchenko (SU 1060035A1).

Regarding claims 12 and 13, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 1. Kohashi et al. in view of Forrest et al. do not disclose expressly the absorption structure comprising a scintillator. Komashchenko teach a device for measuring ionizing radiation consisting of a semiconductor scintillator with solid-state photodetector (including a heterogeneous pn junction) applied to it (Abstract). Komashchenko (SU 1060035 A1) specify that the scintillator is in a layer. It would be obvious to one skilled in the art to modify the invention of Kohashi et al. in view of Forrest et al. by applying a scintillator as taught by Komashchenko, to one of the film electrodes in a thin film layer, in order to increase the electrical signal that is generated.

Regarding claims 14, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 1. Kohashi et al. in view of Forrest et al. do not disclose expressly the absorption structure comprising a scintillator. Komashchenko teaches a device for measuring ionizing radiation consisting of a semiconductor scintillator with solid-state photodetector (including a heterogeneous pn junction) applied to it (Abstract). Komashchenko specifies that the scintillator is in a layer. It would be obvious to one skilled in the art to modify the invention of Kohashi et al. in view of Forrest et al. by integrating a scintillator as taught by Komashchenko, into one of the film electrodes, in order to provide a multifunctional film electrode (dual function of contacting and scintillating) that increase the electrical signal that is generated.

Regarding claim 15, Kohashi et al. in view of Forrest et al. and further in view of Komashchenko teach the limitations set forth in claim 1. Forrest et al. further teach a

diode structure (Figure 6) comprising two film electrodes and a photo-active semiconductor film layer disposed between the two film electrodes. Kohashi et al. in view of Forrest et al. do not disclose expressly the absorption structure comprising a scintillator. Komashchenko teaches a device for measuring ionizing radiation consisting of a semiconductor scintillator with solid-state photodetector (including a heterogeneous pn junction) applied to it (Abstract). Komashchenko specifies that the scintillator is formed in a layer. It would be obvious to one skilled in the art to modify the invention of Kohashi et al. in view of Forrest et al. by integrating a scintillator as taught by Komashchenko, into the photo-active semiconductor film layer, in order to increase the electrical signal that is generated and eliminate the need for additional coupling for the scintillator layer.

5. Claims 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kohashi et al. (JP 73032940 B) in view of Forrest et al. (US 6,198,091 B1) and further in view of Maier (US 4661168 A).

Regarding claim 20, Kohashi et al. in view of Forrest et al. teach the limitations set forth in claim 1. Kohashi et al. in view of Forrest et al. do not disclose expressly the absorption structure comprising a plurality of layers applied by an application technique selected from the group consisting of thermal vaporizations, cathode sputtering, solution centrifuging, and printing. It would be obvious to one of skill in the art that thermal vaporizations, cathode sputtering, solution centrifuging, and printing are common methods for applying layers in semiconductors. Maier et al. teach applying layers to a

semiconductor by thermal vaporizations or cathode sputtering (col. 5, lines 36-51). At the time the invention was made it would be obvious to one skilled in the art that the means for layer application would consist of a technique selected from thermal vaporizations, cathode sputtering, solution centrifuging, and printing, as suggested by Maier et al., since these techniques are the common methods of application for the art.

***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Zettl whose telephone number is (571) 272-6007. The examiner can normally be reached on M-F 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MZ

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